



EPA STAR RFA

Chemical Mechanisms to Address New Challenges in Air Quality Modeling

Informational Webinar for Applicants

May 16, 2019



Webinar Objectives

- Go over application Information in the EPA STAR RFA, [Chemical Mechanisms to Address New Challenges in Air Quality Modeling](#) (Technical, Eligibility, Submission).
- No new information, other than what has already been provided in the RFA.

Webinar Ground Rules

- Please hold your questions till all EPA presentations have been made.
- No specific research project or idea can be discussed, but clarifying questions regarding what is written in the RFA announcement may be answered.



Award Information

- **Estimated Number of Awards:**

Approximately 10 awards, 5 regular and 5 early career

- **Anticipated Funding Amount:**

Approximately \$6 million for all awards

- **Potential Funding per Award:**

Up to a total of \$800,000 for a regular award and up to a total of \$400,000 for an early career award, including direct and indirect costs, with a maximum duration of 3 years



Specific Areas of Interest/ Expected Outputs and Outcomes

....the Agency is soliciting research that will enable and contribute to sustained development of chemical mechanisms for use in global and regional air quality models (AQMs) that can be used to inform air quality management. To sustain development, methodologies and software tools need to be open source; straightforward to update with new understanding, knowledge and data; easy to incorporate into AQMs; transparent to users of chemical mechanisms and AQMs; and have well documented provenance.



Specific Areas of Interest/ Expected Outputs and Outcomes (2)

The focus of this solicitation is on synthesis of data and knowledge, development of methodologies and software tools, and AQM applications. While proposals for laboratory or field studies to collect more data are not the subject of this announcement and therefore not solicited, applicants are strongly encouraged to analyze or synthesize existing laboratory and/or field studies as needed to evaluate the newly developed chemical mechanisms and gain mechanistic understanding of important chemical pathways.



Specific Areas of Interest/ Expected Outputs and Outcomes (3)

Applicants for regular awards should address at least two of the three research areas described below. Regular award applications that do not address a minimum of two research areas may not be rated as highly as those that do (under the Section V.A.2 Responsiveness criteria). Early career applicants should address at least one of the first two research areas. Early career applications that do not address at least one of the first two research areas may not be rated as highly as those that do (under the Section V.A.2 Responsiveness criteria). Applications that address other research areas in addition to those identified below will not necessarily be rated more highly than those that do not.



Specific Areas of Interest/ Expected Outputs and Outcomes (4)

Research Area 1:

How can the important chemical processes relevant to ozone, PM, regional haze, and air toxics be represented in explicit chemical mechanisms with a coherent and integrated treatment of gas, aerosol, aqueous and heterogenous chemistry accounting for both manmade and naturally occurring substances and reactions and applicability to a wide range of atmospheric concentrations and environmental conditions? Of the thousands of compounds in the atmosphere, such as SOA precursors, halogenated compounds, air toxics, and multifunctional, highly oxidized compounds, what are the most important compounds that should be represented in the chemical mechanisms? What methods can be used and improved to describe the reactions and physiochemical properties of those compounds? What are the most critical mechanistic, kinetic, and theoretical data needed for evaluation and development of detailed chemical mechanisms?



Specific Areas of Interest/ Expected Outputs and Outcomes (5)

Research Area #1 (continued)

... development of explicit mechanisms may focus on a specific system (e.g., isoprene, halogens, combustion IVOCs); however, the proposed research should include incorporation of the newly developed mechanisms into an existing detailed or condensed, integrated mechanism containing a comprehensive list of ozone and PM_{2.5} precursors.



Specific Areas of Interest/ Expected Outputs and Outcomes (6)

Research Area 2:

What algorithms, numerical techniques, and software tools can be used for systematic reduction of evolving detailed, integrated chemical mechanisms into application-specific condensed mechanisms appropriate for use in global and regional AQMs? What parameterizations are needed to estimate chemical and physical properties of lumped or representative species? How can the fitness for purpose of these condensed mechanisms be evaluated?

For Research Area #2, the proposed research may use explicit chemical mechanisms generated from the results of Research Area #1 or may use other detailed chemical mechanisms.



Specific Areas of Interest/ Expected Outputs and Outcomes (7)

Research Areas #1 and #2:

...any newly developed mechanisms or condensation schemes should include testing against existing field and/or laboratory data to demonstrate their performance. Testing against laboratory data should account for experimental artifacts (e.g., chamber wall loss) that may impact the analysis. Proposed research should apply the newly developed chemical mechanisms in box and/or Lagrangian models to gain insights on chemistry and document performance of the mechanisms against experimental data. Research may include improving existing condensed mechanisms provided that the new versions are developed based on systematic reduction from detailed mechanisms. Development of evaluation protocols and diagnostic tools (e.g., chemical process analysis outputs such as production of Ox, ozone, and other key species; isopleths of key end points and drivers) are strongly encouraged.



Specific Areas of Interest/ Expected Outputs and Outcomes (8)

Research Area 3:

What are the implications of using condensed mechanisms generated for broad applications or for specific conditions in global or regional air quality models for simulating ozone, PM, regional haze, or air toxics? For example, do the improved chemical mechanisms improve predictions of ozone and PM_{2.5} in the Northeastern United States as well as in regimes with large biogenic emissions? In cold weather events? Downwind of major sources?



Specific Areas of Interest/ Expected Outputs and Outcomes (9)

Research Area 3:

...applicants are strongly encouraged to use new condensed mechanisms generated using the algorithms, techniques, and tools developed in Research Area #2. Also for Research Area #3, applicants are encouraged to investigate topics where current chemical mechanisms have been identified as an important limiting factor for effective representation in AQMs. Proposed analysis should incorporate existing data from long-term networks and intensive field projects. Development of software tools to streamline the incorporation of newly developed condensed mechanisms into open-source AQMs are encouraged.



Eligibility Information

Public and private nonprofit institutions/organizations, public and private institutions of higher education, and hospitals located in the U.S., state and local governments, Federally Recognized Indian Tribal Governments, and U.S. territories or possessions are eligible to apply. Special eligibility criteria apply to the early career award portion of this RFA. See full announcement for more details.



Application Materials

- To apply under this solicitation, use the application package available at Grants.gov (for further submission information see [Section IV.F. Submission Instructions and other Submission Requirements](#)).
- Note: With the exception of the current and pending support form (available at Research Funding Opportunities: How to Apply and Required Forms), all necessary forms are included in the electronic application package. Make sure to include the current and pending support form in your Grants.gov submission.



Other Information

- Please refer to [Section IV. Application And Submission Information](#).
- Please refer to [Section V. Application Review Information](#).
- Solicitation Closing Date:
[Monday June 24, 2019 11:59:59 pm Eastern Time](#)



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